

State of Illinois
Department of Transportation

**CONSTRUCTION INSPECTOR'S CHECKLIST
FOR
STABILIZED SUBBASE, BAM, CAM, PAM & CAM II**

This checklist has been prepared to provide the field inspector a summary of easy-to-read step-by-step requirements relative to the proper construction of Stabilized Subbase, BAM, CAM, PAM & CAM II (Section 312 of the Standard Specifications). The following questions are based on information found in the Standard and Supplemental Specifications, appropriate sections of the Construction Manual and current policy memorandums and letters.

Have you reviewed the Contract Special Provisions, Standard Specifications, Supplemental Specifications and Plans . _____

GENERAL - THE FIRST 7 QUESTIONS APPLY TO ALL BAM, CAM, PAM & CAM II STABILIZED SUBBASES.

1. WIDTH DETERMINATION

Is the width of the stabilized subbase for your job being determined as follows: (Plan note) _____

(The table below is using 7.2 m (24-ft.) wide pavement as the example.)

<u>METHOD OF PAVEMENT CONSTRUCTION</u>	<u>REQUIRED SUBBASE WIDTH</u>	<u>PAY WIDTH</u>
Paving forms	450 mm + 7.2 m + 450 mm = 18" + 24' + 18" =	8.2 m 27 ft
Slipform paver	out-to-out of paver tracks + 75 mm (3") each side	8.2m (27 ft) max.

2. SUBGRADE DENSITY

Are in-place density tests being taken in the completed subgrade at the frequency of at least 1/450 m (1/1500 ft) of subgrade (Sampling Schedule 1, PPG) to ensure that not less than 95% density is being achieved? (Art. 301.03) _____

3. UNSTABLE SUBGRADE

If unstable subgrade conditions are present, is the Contractor being required to make the determined effort of obtaining density as outlined in Article 301.03? _____

Sometimes it may be necessary to undercut the unstable area. Is the excavation for removal and replacement of material outside the 50-mm (2") tolerance being paid for in accordance with Article 109.04? (Art. 301.11) _____

4. PAVING STAKES

Are paving stakes set prior to the fine grading of the earth subgrade left and right at 15 m (50 ft.) intervals; 7.5 m (25 ft.) intervals when any radius is less than 300 m (1000 ft.)? _____

5. SUBGRADE FIELD CHECK

Is the fine-graded earth subgrade being checked by inspectors for required grade and cross section before placing the stabilized subbase? (Art. 301.03) _____

6. DRAINAGE

Is earth subgrade being kept drained by having lateral ditches cut through all adjacent berms of earth paralleling the subgrade? (Art. 301.08) _____

7. SUBGRADE CONDITIONS

If lime modification or stabilization is required, are you prohibiting the mixing or application of the lime with frozen soil? (Art. 302.04 & Art. 310.04) _____

THE FOLLOWING IS A LISTING OF THE SPECIFIED FIELD REQUIREMENTS FOR EACH OF THE STABILIZING MATERIALS, BAM, CAM, PAM & CAM II.

8. BAM, BITUMINOUS AGGREGATE MIXTURE (Art. 312.03 – Art. 312.11)

a. Air Temperature. Is the air temperature in the shade over 10°C (50° F). when placing BAM containing MC-3000? (There is no minimal air temperature requirement when an AC is used in the mix.) (Art. 312.05) _____

b. Delivery Temperature. Is the bituminous aggregate mixture being delivered at a temperature of 110°C (225 °F) to 165°C (325 °F)(Art. 312.10)? _____

(No delivery temperature requirement with MC mixes.) 95°C (200 °F) for dryer drum plant. (Art. 312.10) _____

c. Mechanical Spreader. Is the BAM mixture being deposited with a mechanical spreader approved by the Engineer? (Art. 312.10) _____

d. Trucks. When Asphalt Cement is used in the mixture, are you checking the temperature of the mixture behind the spreader? _____

(If a mat temperature of 95°C (200 °F) or higher cannot be maintained behind the spreader, insulated and covered trucks will be required.) (Art. 312.09)

- e. Temperature Records. Is a record being kept of all temperature checks being made by the inspector? _____
- f. Compaction Equipment. Is each layer being compacted to the required density with compaction equipment meeting the following requirements? (Art. 312.04) _____
 - (1) Three-wheel and tandem rollers: 5.5 metric tons (6 tons) to 11 metric tons (12 tons) total weight; 33N/mm (190 lbs. per inch) 70 N/mm (400 lbs. per inch) of width of roller. _____
 - (2) Pneumatic-tired rollers: shall develop a compression of not less than 53 N/mm (300 lbs. per inch) width of tire tread. _____
 - (3) Vibrating rollers and vibrating compactors must meet with the approval of the Engineer. (Art. 1101.01) _____
 - (4) Trench rollers: 53 N/mm (300 lbs. per inch) - 70 N/mm (400 lbs. per inch) width on the compaction wheel. _____
- g. Density Specimens. Are tests being taken at least once every 0.8 km (1/2 mile), per lift, per lane by one of the following? (Sampling Schedule 4, PPG) _____
 - (1) Nuclear testing device, otherwise, _____
 Is the Contractor coring, identifying and delivering to the field laboratory cores from each day's run? (_____
 - (2) When MC mixes are used, coring specimens may be impractical. If this is the case, are you determining densities by the Sand Cone Method? _____
 - (3) Are all holes being refilled immediately with a bituminous mixture meeting the approval of the Engineer? _____
- h. Density Requirements. Is the subbase being compacted to at least the following densities? (Art. 312.10)
 - (1) If placed in one layer, 88% _____
 - (2) If placed in 2 layers, 88% 1st layer; 90% 2nd layer. _____
- i. Material Substitution. If desired, the Contractor may substitute Class I, Mixture A, B or C (Section 406 of the Standard Specifications) for BAM for use in leveling and in areas where small quantities of subbase are required. (Art. 312.08)

- j. Thickness Test. Are you taking a thickness test at every 75m (250 ft)? (Section A, Documentation Section of the Construction Manual) _____

9. CAM, CEMENT AGGREGATE MIXTURE (Art. 312.12 – Art. 312.20)

- a. Air Temperature. Is the air temperature in the shade over 4°C (40 °F) when placing the CAM mixture? (Art. 312.14) _____

- b. Moisture Content. Is the moisture content of the delivered CAM mixture within 80% to 110% of the optimum moisture determined? (Art. 312.16) _____

- c. Placing. Is the CAM mixture being deposited, full subbase width, with a mechanical spreader or spreader box of a type approved by the Engineer, in a manner which will not cause segregation and which will require minimum blading or manipulation? (Art. 312.17) _____

- d. Time Limits. Is compaction started within 60 minutes from the time water is added to the mixture? _____

Is compaction started within 30 minutes from the time the material is deposited on the roadbed? (Art. 312.17) _____

- e. Thickness. Is the CAM subbase being constructed in one layer? _____

If the Contractor elects or if density cannot be complied with is the mixture being placed and compacted in two equal layers and during the same working day? _____

If so, is the lower lift being maintained in a moist condition by means of a fine spray until the second layer is placed? _____

Just prior to placing the second layer, is the top 13 mm ($1/2$ inch) of the lower layer being scarified? (Art. 312.17) _____

- f. Compaction. Is each layer being fully compacted within 2 hours of the time that the water is added to the mixture with compaction equipment meeting the following requirements? (Art. 312.17) _____

(1) Three-wheel and tandem rollers: 5.5 metric tons (6 tons) to 11 metric tons (12 tons) total weight; 33 N/mm (190 lbs. per inch) 70 N/mm (400 lbs. per inch) of width. _____

(2) Pneumatic-tired rollers: shall develop a compression of not less than 40 N/mm (225 lbs. per inch) width of tire tread. _____

(3) Vibrating rollers and vibrating compactors: must meet with the approval of the Engineer. _____

(4) Tamping rollers: (Sheeps-foot type) shall not be less than 2.4 m (8 ft) in width constructed in two or more independent

sections having a minimum weight of 16 N/mm (90 lbs. per inch) width of drum. Must penetrate within 25 mm (1 inch) of the prepared subgrade on the initial rolling. _____

- (5) Trench rollers: 53 N/mm (300 lbs. per inch) 70N/mm (400 lbs. per inch) width of compaction wheel. _____

- g. Finishing. Is the surface of the compacted CAM being trimmed and finished within the same day it was spread? _____

Is the surface being sprayed with a fine mist to maintain the optimum moisture content during all finishing operations and until curing material is applied? (Art. 312.18) _____

- h. Density Test. Are you taking density tests in the finished subbase? (The test should be taken at least every 300 m (1000 ft.) of subbase, Sampling Schedule 2, PPG) _____

- i. Density Requirement. Are all areas that are found to have densities less than 100% being corrected or replaced? _____

- j. Thickness Test. Are you taking a thickness test at every 75m (250 ft)? (Section A, Documentation Section of the Construction Manual) _____

- k. Curing. Within 24 hours of the finishing operations, is the subbase surface being protected and covered 7 days by a uniform application of bituminous material at an application rate of approximately 1 L/m² (0.20 gal. per sq. yd)? (Art. 312.19) _____

- i. Construction Joints. Are straight and vertical transverse construction joints being formed by cutting into the completed work at the end of each day's construction? (Art. 312.20) _____

10. **PAM, POZZOLANIC AGGREGATE MIXTURE (312.21- 312.28)**

- a. Air Temperature. Is the PAM subbase being constructed within the dates shown in Article 312.23 of the Standard Specifications and only when the air temperature in the shade is above 4°C (40 °F)? _____

- b. Placing. Is the PAM mixture being deposited, full subbase width, with a mechanical spreader or spreader box of a type approved by the Engineer, in a manner which will not cause segregation and which will require minimum blading or manipulation? (Art. 312.26) _____

- c. Thickness. Is the PAM subbase being constructed in layers of not more than 100 mm (4 inches) when compacted or as otherwise provided for in accordance with Article 312.26? _____

Is the lower lift being maintained in a moist condition by means of a fine spray until the second layer is placed? (Art. 312.26) _____

- d. Compaction. Is each layer being fully compacted within 3 hours of the time water is added to the mixture (90 minutes if using cement flyash) with compaction equipment meeting the following requirements? (Art. 312.22) _____
- (1) Three-wheel and tandem rollers: 5.5 metric tons (6 tons) to 11 metric tons (12 tons) total weight; 33 N/mm (190 lbs. per inch) 70 N/mm (400 lbs. per inch) of width. _____
- (2) Pneumatic-tired rollers: shall develop a compression of not less than 40N/mm (225 lbs. per inch) width of tire tread. _____
- (3) Vibrating rollers and vibrating compactors: must meet with the approval of the Engineer. _____
- (4) Tamping rollers: (Sheeps-foot type) shall not be less than 2.4 m (8 ft) in width constructed in two or more independent sections having a minimum weight of 15 N/mm (90 lbs. per inch) width of drum. Must penetrate within 25 mm (1 inch) of the prepared subgrade on the initial rolling. _____
- e. Finishing. Is the surface of the compacted PAM being trimmed and finished within the same day it was spread? _____
- Is the surface being sprayed with a fine mist to maintain the optimum moisture content during all finishing operations and until curing material is applied? _____
- f. Density Test. Are density tests being taken in the finished sub-base? (The test must be taken at least every 450m (1500ft.) of subbase, Sampling Schedule 2, PPG) _____
- g. Density Requirements. Is the subbase being compacted to at least the following densities? _____
- (1) If placed in one layer, 97% _____
- (2) If placed in 2 layers, 97% 1st layer; 100% 2nd layer. _____
- h. Thickness Test. Are you taking a thickness test at every 75m (250 ft)? (Section A, Documentation Section of the Construction Manual) _____
- i. Curing. Within 24 hours of the finishing operations, is the subbase surface being protected and covered 7 days by a uniform application of bituminous material at an application rate of approximately 1L/m² (0.20 gallons per sq. yd.)? (Art. 312.27) _____
- j. Construction Joints. Are straight and vertical transverse construction joints being formed by cutting back into the completed work at the end of each day's construction? (Art. 312.28) _____

11. CAM II, PLASTIC PORTLAND CEMENT (Art. 312.29 – Art. 312.35)

- a. Air Temperature. Is the air temperature in the shade above 4°C (40°F) when placing CAM II? (Art. 312.32) _____

- b. Placing. CAM II can be placed in one layer by the use of either forms or slipform methods. (312.32)

If forms are used, are the requirements of Article 420.06 regarding base support, setting, alignment and forms being followed? _____

If slipform methods are used, are the requirements of Article 420.17, paragraphs 1, 2, 7 and 10 regarding placing, consolidating and furnishing being met? _____

- c. Time Limits. Is the CAM II being deposited in place within 30 minutes after mixing when hauled in nonagitating trucks and within 60 minutes when hauled in agitator trucks? (Art. 1020.11) _____

- d. Finishing and Testing. Are finishers checking the plastic CAM II with a 3 m (10 ft.) straightedge? _____

Are all surface variations greater than 5 mm (3/16 inch) being corrected? (Art. 312.33) _____

- e. Air Content. Are you testing the delivered unconsolidated mixture for air (7 to 10%) at least every 75 m (250 ft.) of subbase? Record and retain in job records. (Note - A reading taken at 70 kPa (10 psi) multiplied by 1.25 will give a comparable 105 kPa (15 psi) reading.) (Art. 312.31) _____

- f. Slump. Are you periodically testing the delivered unconsolidated material for slump 25 mm - 75 mm (1 inch - 3 inches)? Record and retain in job records. (Art. 312.31) _____

Curing. Is the entire surface of the subbase being given two separate uniform applications, separated by at least one minute, of agitated Type III (white) membrane curing compound?
Application rate = 1 L/m² (0.2 gal. per sq. yd.) (1020.13(a)(4)) _____

Is the spraying equipment self-propelled and does it meet the additional requirements of Article 1101.09? _____

GENERAL - THE LAST FOUR QUESTIONS APPLY TO ALL BAM, CAM, PAM & CAM II STABILIZED SUBBASES:

12. THICKNESS TEST

Are you cross sectioning or probing the stabilized subbase at intervals of at least every 75 m (250 ft.)? (Section A, Documentation Section of the Construction Manual) _____

13. NOMINAL THICKNESS

Is the thickness of completed stabilized subbase constructed to the nominal plan thickness? If not, corrective action must be taken prior to the concrete placement. (312.36)

14. DOCUMENTATION OF CONTRACT QUANTITIES

- a. If the Contractor and the Engineer agree in writing (Form BC-981) that the plan quantity of STABILIZED SUBBASE is accurate, no measurements will be required. (If an error or revision is later found, measurements for only the affected area will be required.)
- _____

In the absence of the written agreement, documentation shall be provided as follows:

- b. The subbase shall be measured in place and the area computed in square meters (square yards). The width dimension used shall not exceed the width determined in Question #1 of this checklist. The longitudinal measurement shall be along the actual surface of the roadway and not horizontally.
- _____

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